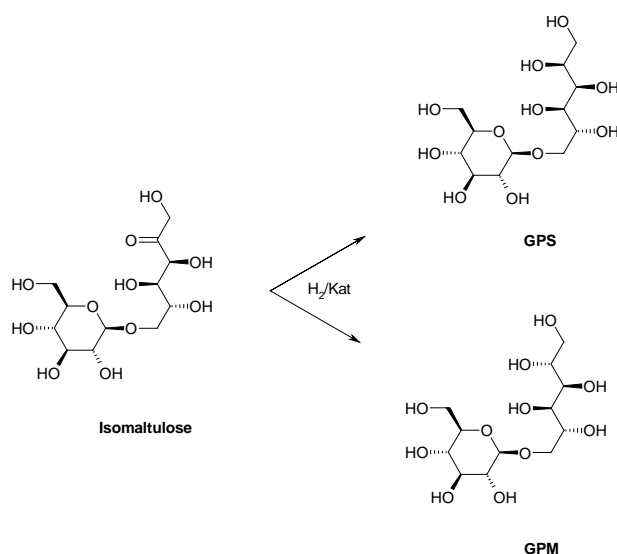


Abstract

In many applications, sugar is a very advantageous product. Nevertheless, in special cases there is a need for alternatives. Technically, the synthesis of sugar substitutes often causes big problems and is not trivial. Predominantly, these products are formed by hydrogenation of saccharides often leading to different diastereomers. This can be shown, for example, by isomalt, an equimolar composition of the two diastereomers of 1,6-GPS (6- α -D-glucopyranosido-D-sorbitol) and 1,1-GPM-dihydrate (1- α -D-glucopyranosido-D-mannitol-dihydrate), which can be obtained by catalytic hydrogenation of isomaltulose (6- α -D-glucopyranosido-D-fructose).



Depending on the application, it is necessary to only obtain one special diastereomere. This may be realized best by the use of highly selective catalysts.

In this project, different saccharides were hydrogenated selectively. Various homogeneous catalyst systems have been analyzed regarding selectivity and activity. Therefore, the ligands as well as the metall centres have been varied. The best results for the hydrogenation of isomaltulose were obtained by utilizing an *in situ* generated ruthenium catalyst with a DPEphos ligand. The reaction conditions such as hydrogen pressure, reaction temperature and ligand/metall ratio have been optimized for this system. Furthermore, the recyclisation of this system has been investigated by using different multiphasic systems comprising organic solvents or ionic liquids. To examine the reaction mechanism, NMR measurements were carried out under reaction conditions.